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ENVIRONMENTAL RADIOACTIVITY IN GREENLAND IN 1977

A. Aarkrog and J. Lippert

ABSTRACT

Measurements of fallout radioactivity in Greenland in 1977 are reported. Strontium-90 (and Cesium-137 in most cases) was determined in samples of precipitation, sea water, vegetation, animals, and drinking water. Estimates are given of the mean contents of ^{90}Sr and ^{137}Cs in the human diet in Greenland in 1977.

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INIS DESCRIPTORS

[0] DEER
DIET
ENVIRONMENT
FISHES
FOOD CHAINS
GLOBAL FALLOUT
GREENLAND
PLANTS
RADIOACTIVITY
SEAWATER
SHEEP
EXPERIMENTAL DATA
TABLES

[1] ATMOSPHERIC PRECIPITATIONS
DRINKING WATER
STRONTIUM 90

[2] CESIUM 137

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ABBREVIATIONS AND UNITS

FP	fission products
pCi	picocurie, 10^{-12} Ci, μμCi
nCi	nanocurie, 10^{-9} Ci, mμCi
mCi	millicurie, 10^{-3} Ci
S.U.	pCi ^{90}Sr (g Ca)$^{-1}$
M.U.	pCi ^{137}Cs (g K)$^{-1}$
nSr	natural (stable) Sr
S.D.	standard deviation, $\sqrt{\frac{\Sigma(\bar{x}-x_i)^2}{(n-1)}}$
S.E.	standard error, $\sqrt{\frac{\Sigma(\bar{x}-x_i)^2}{n(n-1)}}$
S.S.D.	sum of squares of deviation, $\Sigma(\bar{x}-x_i)^2$
f	degrees of freedom
s^2	the variance
v^2	the ratio between the variance in question and the residual variance
P	the probability fractile of the distribution in question
$\bar{x}$	mean value
η	coefficient of variation, relative S.D.
Σ	sum
anova	analysis of variance
A	η = 20-33% (counting error)
B	η > 33% (counting error)
B.D.L.	below detection limit

1. INTRODUCTION

1.1.

In 1977 the sampling programme was similar to that used in previous years but for a few minor modifications.

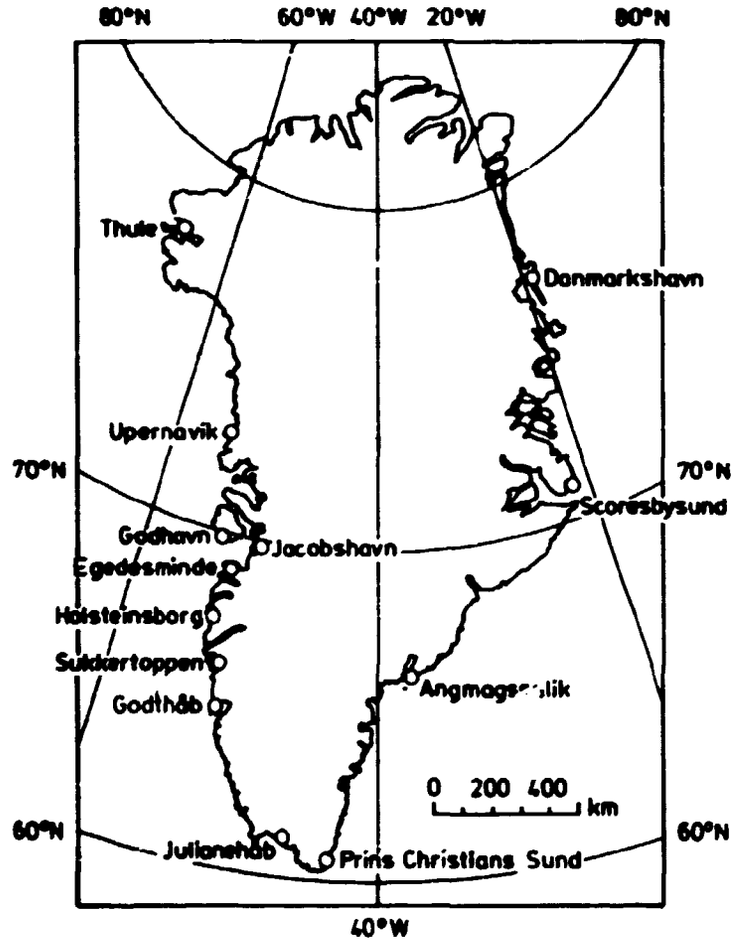

Fig. 1. Greenland

1.2.

As hitherto, samples were collected through the local district physicians and the heads of the telestations. However, as it was impossible to obtain all samples specified in the programme, a number of samples were obtained from the Royal Greenland Trade Company.

1.3.

The estimated mean diet in Greenland was the same as that in 1962, i.e., it agreed with the estimate given by Professor E. Hoff-Jørgensen, Ph.D.

1.4.

The environmental studies in Greenland were carried out together with corresponding investigations in Denmark (cf. Risø Report No. 386)[2] and in the Faroes (cf. Risø Report No. 387)[3].

1.5.

The present report does not repeat information concerning sample collection and analysis already given in ref. 1.

2. RESULTS AND DISCUSSION

2.1. Strontium-90 in precipitation

Table 2.1.1 shows the results of the measurements.

The ^{90}Sr concentrations in 1977 at the Greenland stations were approx. 3 times the 1976 figures. In Denmark[2] and the Faroes[3] the fallout levels increased similarly from 1976 to 1977.

Table 2.1.1. Strontium-90 in precipitation collected in Greenland in 1977

Location	Unit	Jan-March	April-June	July-Sept	Oct-Dec	1977
Upernavik	pCi l^{-1}	0.58	0.39	(0.40)	0.73	$\bar{x}$ 0.65
I 293 mm*	mCi km^{-2}	0.016	0.041	(0.081)**	0.051	I 0.19
Godhavn	pCi l^{-1}	0.31	0.77	0.88	0.80	$\bar{x}$ 0.76
I 396 mm	mCi km^{-2}	0.013	0.090	0.061	0.135	I 0.30
Godthåb	pCi l^{-1}	0.67	0.76	0.71	0.44	$\bar{x}$ 0.62
I 616 mm	mCi km^{-2}	0.046	0.159	0.071	0.106	I 0.38
Prins Chr.Sund	pCi l^{-1}	0.143	0.40	0.41	0.43	$\bar{x}$ 0.31
I 2986 mm*	mCi km^{-2}	0.151	0.20	0.30	0.29	I 0.94
Kap Tobin	pCi l^{-1}	0.12	0.36	0.52	0.82	$\bar{x}$ 0.52
I 268 mm	mCi km^{-2}	0.007	0.010	0.045	0.078	I 0.14
Danmarkshavn	pCi l^{-1}	0.16	(0.44)	0.99	0.69	$\bar{x}$ 0.75
I 155 mm*	mCi km^{-2}	0	(0.008)**	0.055	0.055	I 0.12

* The missing amount of precipitation was kindly supplied by Mr. Gunnar Nielsen, Danish Meteorological Institute.

**Estimated from VAR 3, due to missing samples.

Table 2.1.2. Analysis of variance of ln pCi ^{90}Sr l^{-1} precipitation in Greenland 1977 (from Table 2.1.1.)

Variation.	SSD	f	s^2	v^2	P
Between quarters	4.033	3	1.344	6.505	99.48
Between locations	1.833	5	0.367	1.774	-
Remainder	2.687	13	0.207		

2.2. Strontium-90 in sea water

Five samples were obtained in 1977. Table 2.2 shows the results. The ^{90}Sr level was comparable with those of the previous years. The $^{137}Cs/^{90}Sr$ mean ratio was 1.22, i.e. there was no indication of any surplus ^{137}Cs in Greenland waters in the 1977 samples, which was contrary to the observations of earlier years.

Table 2.2. Strontium-90 and Cesium-137 in sea water from Greenland in August 1977

Location	pCi ^{90}Sr l^{-1}	pCi ^{137}Cs l^{-1}	Salinity o/oo
Angmagssalik	0.22	0.22	20.1
Prins Chr.Sund	0.16	0.27	31.3
Godhavn	0.15	0.18	32.8
Samples* from	0.12	0.16	26.7
Godthåb and Thule	0.71	0.62	8.5

*The labels of the sample containers had come off so it was not possible to identify which of the samples were from Thule and which from Godthåb.

2.3. Strontium-90 and ^{137}Cs in terrestrial animals

Three samples of lamb were received from Julianehåb in 1977. The mean levels were 6.1 pCi ^{90}Sr kg^{-1} meat and 2.5 nCi ^{137}Cs kg^{-1}. The lamb bones contained 169 pCi ^{90}Sr (g Ca)$^{-1}$.

Three samples of reindeer from the Greenlandic west coast showed mean levels of 6.2 pCi ^{90}Sr kg^{-1} meat, 2.1 nCi ^{137}Cs kg^{-1} and in bone: 65 pCi ^{90}Sr (g Ca)$^{-1}$. In November 1976 three samples of muskox were collected at Scoresby Sund in East Greenland. These samples contained 1.4 pCi ^{90}Sr kg^{-1} meat and 102 pCi ^{137}Cs kg^{-1}. The bone level was 10.5 pCi ^{90}Sr (g Ca)$^{-1}$.

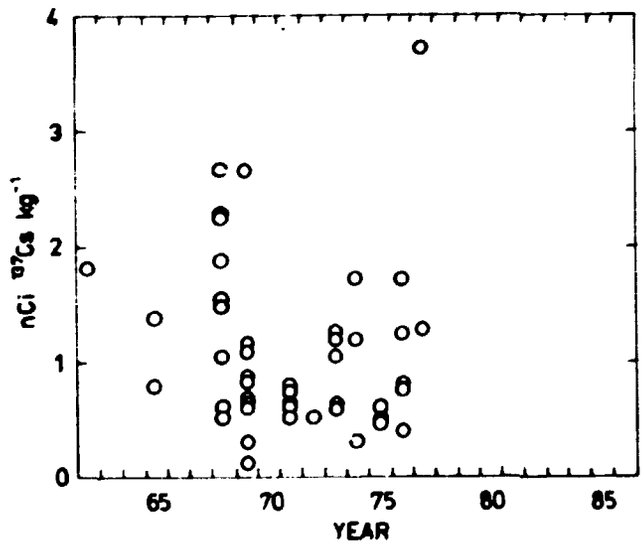

Fig. 2.3.1. Cesium-137 in mutton, 1962-1977.

Table 2.3.2.1. Strontium-90 and Cesium-137 in terrestrial animals collected in Greenland in 1977

Date	Location	Sample type		pCi ^{90}Sr kg^{-1}	pCi ^{90}Sr (g Ca)$^{-1}$	pCi ^{137}Cs kg^{-1}	pCi ^{137}Cs (g K)$^{-1}$
Aug	Julianehåb I	Lamb	Meat	6.1	78	1200	
"	- " -	- " -	Bone		157		
Aug	Julianehåb II	Lamb	Meat			[illegible]	765
"	- " -	- " -	Bone		140		
Aug	Julianehåb III	Lamb	Bone		202		
Summer	Eqaloqarnaaq	Reindeer leg	Meat	5.3	78	2590	691
"	- " -	- " -	Bone		55		
Summer	Eqaloqarnaaq	Rei-deer back	Meat	3.9	60	944	368
"	- " -	- " -	Bone		76		
March	Holsteinsborg	Reindeer	Meat	9.1	145	2750	814
"	- " -	- " -	Bone		61		
November	Scoresbysund I	Muskox*	Meat			68**	19.7**
"	- " - II	- " -	Meat	1.44	15.8	171	
"	- " - III	- " -	Meat			71	
"	Scoresbysund I+II+III	- " -	Bone		10.5		

*Collected in November 1976.

**A preliminary result was mentioned in RH 36[1] for this sample.

2.4. Strontium-90 and Cesium-137 in sea animals

Two samples of seabirds (guillemot and eider) were analysed in 1977 (table 2.4.1). The mean levels were 0.16 pCi ^{90}Sr kg^{-1} flesh and 8 pCi ^{137}Cs kg^{-1}.

The levels in fish, whale and seals are shown in table 2.4.2. The mean levels in fish and shrimps were: 0.5 pCi ^{90}Sr kg^{-1} flesh, 11 pCi ^{137}Cs kg^{-1} flesh, and seal contained 0.14 pCi ^{90}Sr kg^{-1} meat and 17 pCi ^{137}Cs kg^{-1}. Strontium-90 was not measurable in the two samples of whale; the ^{137}Cs mean content was 28 pCi kg^{-1}.

Table 2.4.1. Strontium-90 and Cesium-137 in sea birds collected in Greenland (Julianehåb) in 1977

Species	Sample type	pCi ^{90}Sr kg^{-1}	pCi ^{90}Sr (g Ca)$^{-1}$	pCi ^{137}Cs kg^{-1}	pCi ^{137}Cs (g K)$^{-1}$
Guillemot	Meat	0.13 B	1.7 B	9.4 A	2.9 A
- " -	Bone		0.094		
Eider	Meat	0.19 B	2.0 B	6.3 B	2.0 B
- " -	Bone		0.096		

Table 2.5.1. Strontium-90 and Cesium-137 in some animals collected in Greenland in 1977

Location	Species	Date	Sample type	pCi ^{90}Sr kg^{-1}	pCi ^{90}Sr /g Ca^{-1}	pCi ^{137}Cs kg^{-1}	pCi ^{137}Cs /g K^{-1}
Julianehåb	Seal	Summer	Meat	0.132	2.1	13.8	0.6
" "	" "	" "	Bone		0.006 A		
Jørgenbjerg	Seal	June	Meat	0.17 B	2.5 B	11.3	0.8
" "	" "	" "	Bone		2.79		
Qaqortoq	Seal		Meat			22	0.2
" "	" "		Bone		0.077 B		
R.G.H.* I	Seal		Meat	0.095 B	2.6 B	31	0.9
" "	" "		Bone		0.049 B		
R.G.H.* II	Seal		Meat	0.26 B	6.5 B	17.0	0.1
" "	" "		Bone		0.032 B		
Angmagssalik	Seal		Meat	0.11 B	2.6 B	15.9	0.2
" "	" "		Bone		B.D.L.		
Scoresbysund	Seal	Nov*	Meat	B.D.L.	B.D.L.	15.1	0.6
" "	" "	" "	Bone		0.075 B		
Holsteinsborg	Whale	Aug	Meat	B.D.L.	B.D.L.	0*	11.0
Qaqortoq	Lesser rorqual	Summer	Meat	B.D.L.	B.D.L.	12.0	0.5
Julianehåb	Cod	Sept	Meat	0.09 B	0.09 B	14.4	0.1
" "	" "	" "	Bone		0.172		
R.G.H.	Cod		Meat	B.D.L.	B.D.L.	16.9	0.3
R.G.H. I	Salmon		Meat	0.57 B	2.1 B	5.8	1.4
" "	" "		Bone		0.67		
R.G.H. II	Salmon		Meat	0.12 B	0.84 B	0.2 B	1.1 B
" "	" "		Bone		0.965		
Holsteinsborg	Salmon	Aug	Meat	0.97 B	6.8 B	25	5.5
" "	" "	" "	Bone		6.7		
R.G.H.	Shrimp		Meat	9.36	0.61	6.6	1.0
Julianehåb	Greenland halibut	June	Meat	0.21	0.75	15.6	0.1
" "	" "	" "	Bone		0.160		
Angmagssalik	Angmagssatter		Total	0.03 B	0.30 B	0.2	2.3
Qaqortoq	Angmagssatter		Total	0.29	0.10	3.5 A	1.0 A

*Collected in November 1976.

R.G.H. Royal Greenland Trade Company

2.5. Strontium-90 and Cesium-137 in vegetation

Lichen, moss, grass, crowberry and seaweed were collected along the Greenland coast during the summer. Table 2.5 shows the results.

The geometric mean levels in moss and lichen were 3.9 nCi ^{90}Sr kg^{-1} and 12 nCi ^{137}Cs kg^{-1}. The levels in lichen are compatible with the values observed earlier (cf. fig. 2.5).

Table 2.5. Strontium-90 and Caesium-137 in vegetation samples collected in Greenland in 1977

Location	Species	Sampling time	pCi ^{90}Sr kg^{-1}	pCi ^{90}Sr g Ca^{-1}	pCi ^{137}Cs g ash^{-1}	pCi ^{137}Cs kg^{-1}	pCi ^{137}Cs g K^{-1}
Sukkertoppen	Lichen	Summer	12,300	2,300		61,600	44,000
Ilulissat/Jakobshavn	Lichen	- " -	5,010	1,500		10,300	6,300
Ilulissat/Jakobshavn	Moss	- " -	10,600	3,130		8,170	6,100
Prins Chr.Sund	Moss	- " -	6,230	3,630		13,300	3,630
Søndre Strømfjord	Moss	- " -	197	267		6,100	166
Sukkertoppen	Grass	- " -	1,630	306		3,250	1,300
Søndre Strømfjord	Grass	- " -	137	200		566	30
Søndre Strømfjord	Crowberry	- " -				279	373
Prins Chr.Sund	Crowberry leaves and twigs	- " -		695	72		
Sukkertoppen	Crowberry leaves and twigs	- " -		695	61		
Angmagssalik	Pecten vesiculosus			5.3		B.D.L.	B.D.L.
Prins Chr.Sund	Pecten vesiculosus			2.9	0.10 A		1.5 A

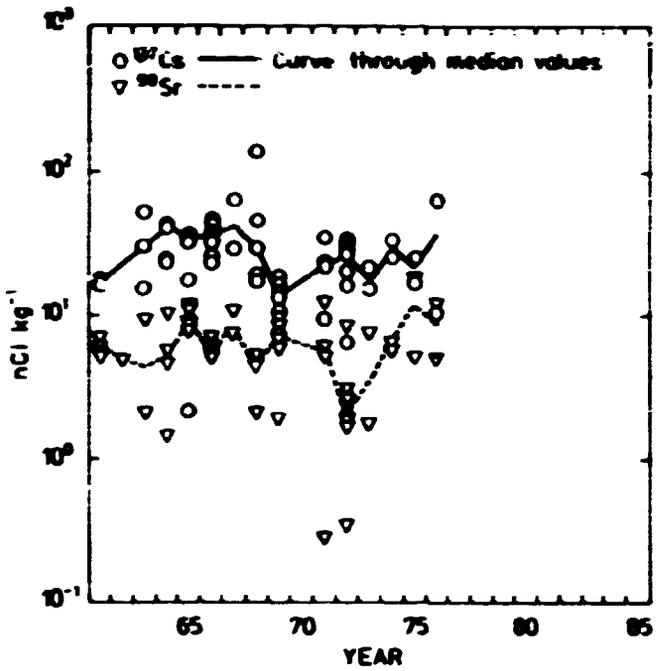

Fig. 2.5. Caesium-137 and Strontium-90 in lichen (fresh weight) collected along the Greenlandic coast, 1962-1977.

2.6. Strontium-90 in drinking water

Quarterly samples of drinking water were collected from a number of locations in Greenland. Table 2.6 shows the results from 1977, and fig. 2.6 the geometric annual means of all samples for the period 1962-1977.

As in previous years, we found it most expedient to choose the geometric mean of all figures, i.e. 0.37 pCi $^{90}Sr\ l^{-1}$, as representative of the mean level of ^{90}Sr in Greenland drinking water in 1977, this level was not different from that observed in 1976.

Table 2.6. Strontium-90 in drinking water collected in Greenland in 1977. (Unit: pCi $^{90}Sr\ l^{-1}$)

Location	Jan-March	April-June	July-Sept	Oct-Dec
Danmarkshavn		1.87		
Upernavik	0.09 B		0.47	0.23 B
Godthåb	0.41	0.40	0.33	0.36
Prins Chr.sund	2.1	0.63	1.72	
Godhavn	0.04 B			
Scoresbysund	0.09 B	0.48	0.24	0.39

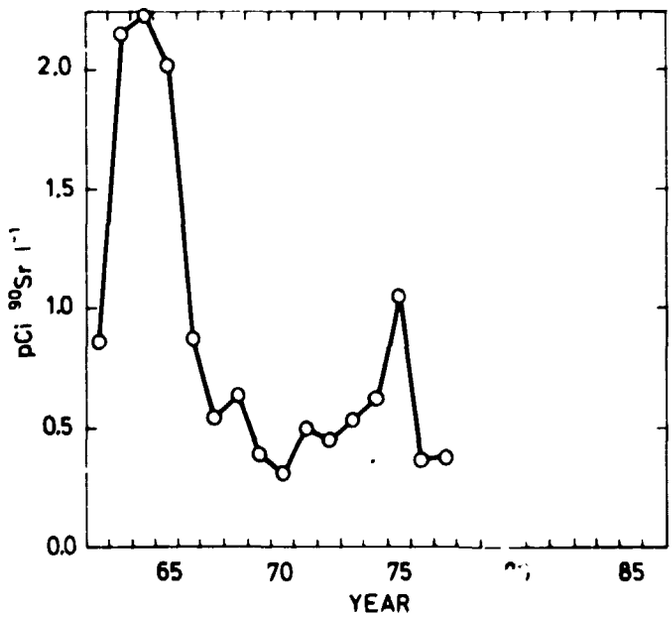

Fig. 2.6. Strontium-90 in Greenlandic drinking water (Geometric mean), 1962-1977.

3. ESTIMATE OF THE MEAN CONTENTS OF ^{90}Sr AND ^{137}Cs IN THE HUMAN DIET IN GREENLAND IN 1977

3.1. The annual quantities

The estimate of the daily per capita intake of the different foods in Greenland is still based on the figures given in 1962 by Professor E. Hoff-Jørgensen, Ph.D., in Risø Report No. 65[1].

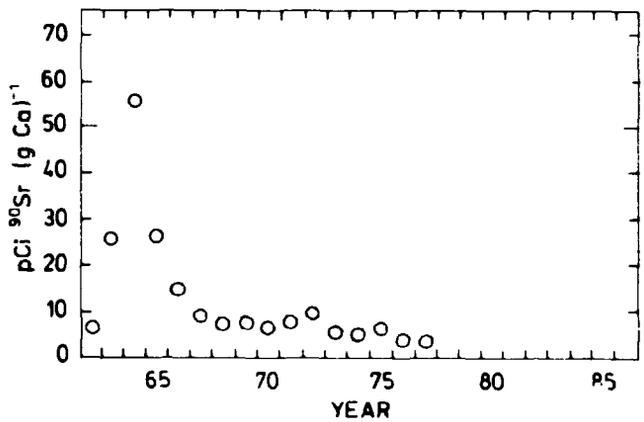

Fig. 3.1. Strontium-90 in Greenlandic diet, 1962-1977.

3.2. Milk products

All milk consumed in Greenland was imported as milk powder from Denmark. The mean radioactivity content in milk prepared from Danish dried milk produced in 1977 was 3.5 pCi ^{90}Sr kg^{-1} and 5.1 pCi ^{137}Cs kg^{-1} [2].

Cheese was also imported from Denmark and contained 24.6 pCi ^{90}Sr kg^{-1} and 3.7 pCi ^{137}Cs kg^{-1}.

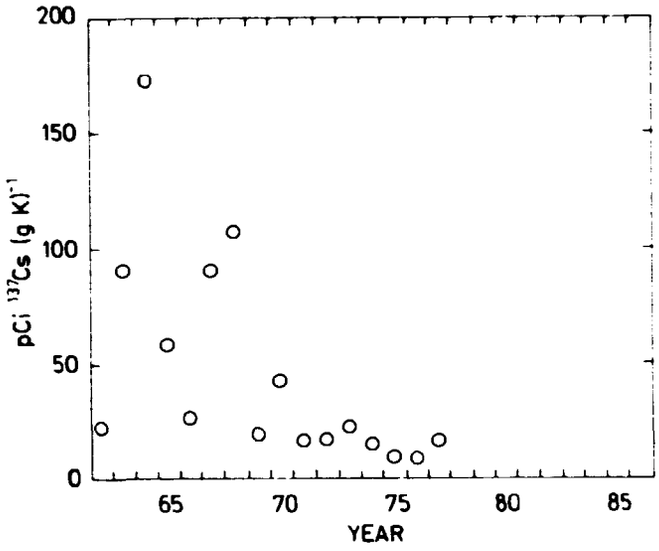

Fig. 3.2. Cesium-137 in Greenlandic diet, 1962-1977.

3.3. Grain products

All grain was imported from Denmark. It is assumed that only grain from the harvest of 1976 was consumed in Greenland during 1977. The daily per capita consumption was: rye flour (100% extraction): 80 g, wheat flour (75% extraction): 110 g, rye flour (70% extraction): 20 g, biscuits (rye, 100% extraction): 27 g, and grits: 25 g. The content of ^{90}Sr in these five products was 22, 3.4, 4.4, 16.3, and 9.2 pCi kg^{-1} respectively. Hence the mean content of ^{90}Sr in grain products was 11 pCi kg^{-1}. The content of ^{137}Cs in the five products was 11.8, 2.4, 5.9, 8.7, and 4.2 pCi kg^{-1}. Hence the mean content of ^{137}Cs in grain products was 6.4 pCi kg^{-1}.

The activity levels in rye flour (100% extraction), wheat flour (75% extraction), and grits were all taken from tables 5.9.1 and 5.9.2 in Risø Report No. 386[2]. The ^{90}Sr level in rye flour (70% extraction) was calculated analogously with the level in wheat flour (75% extraction), i.e. as one-fifth of the whole-grain activity. The ^{137}Cs content in rye flour (70% extraction) was calculated as one half of the whole-grain level in rye in analogy with the ratio between ^{137}Cs in whole wheat grain and in wheat flour (75% extraction)[2]. The ^{90}Sr and ^{137}Cs contents

in biscuits were calculated by dividing the levels of the rye flour (100% extraction) by 1.35, since 1 kg flour yields 1.35 kg bread[2].

3.4. Potatoes, other vegetables, and fruit

The Danish mean levels for 1977 were used[2] since the local production is insignificant compared with imports from Denmark.

The Danish mean levels were: in potatoes 1.6 pCi $^{90}Sr\ kg^{-1}$ and 4.6 pCi $^{137}Cs\ kg^{-1}$, in other vegetables 7.1 pCi $^{90}Sr\ kg^{-1}$ and 2.1 pCi $^{137}Cs\ kg^{-1}$, and in fruit 2.2 pCi $^{90}Sr\ kg^{-1}$ and 3.4 pCi $^{137}Cs\ kg^{-1}$.

3.5. Meat

Nearly all meat consumed in Greenland is assumed to be of local origin. Approx. 10% comes from sheep, 5% from reindeer, 60% from seals, 5% from whales, and 20% from sea birds and eggs.

The activity in reindeer and lamb was estimated from 2.3. Activity in seals and whales was estimated from 2.4 and so was the levels of sea birds and eggs. Hence the mean levels in Greenland meat from 1977 were 0.8 pCi $^{90}Sr\ kg^{-1}$ and 368 pCi $^{137}Cs\ kg^{-1}$.

3.6. Fish

All fish consumed was of local origin, and the mean levels from 2.4 were used, i.e. 0.5 pCi $^{90}Sr\ kg^{-1}$ and 11 pCi $^{137}Cs\ kg^{-1}$.

3.7. Coffee and tea

The Danish figures for 1977[2] were used for coffee and tea, i.e. 7.3 pCi $^{90}Sr\ kg^{-1}$ and 35.7 pCi $^{137}Cs\ kg^{-1}$.

Table 3.1. Estimate of the mean content of ^{90}Sr in the human diet in Greenland in 1977

Type of food	Annual quantity in kg	pCi ^{90}Sr per kg	Total pCi ^{90}Sr	Percentage of total ^{90}Sr in food
Milk and cream	78	3.5	273	14.7
Cheese	2.5	24.6	62	3.3
Grain products	95.6	11	1052	56.4
Potatoes	32.8	1.6	52	2.8
Vegetables	5.5	7.1	39	2.1
Fruit	13.5	2.2	30	1.6
Meat and eggs	45.6	0.8	36	1.9
Fish	127.6	0.5	64	3.4
Coffee and tea	7.3	7.3	53	2.9
Drinking water	548	0.37	203	10.9
Total			1864	100.0

The mean annual calcium intake is estimated to be 560 g (approx. 200-250 g creta praeparata). Hence the ^{90}Sr (g Ca)$^{-1}$ ratio in Greenland total diet in 1977 was 3.3 S.U. and the daily intake 5.1 pCi ^{90}Sr.

Table 3.2. Estimate of the mean content of ^{137}Cs in the human diet in Greenland in 1977

Type of food	Annual quantity in kg	pCi ^{137}Cs per kg	Total pCi ^{137}Cs	Percentage of total ^{137}Cs in food
Milk and cream	78	5.1	399	2.0
Cheese	2.5	3.7	9	0
Grain products	95.6	6.4	612	3.1
Potatoes	32.8	4.6	151	0.8
Vegetables	5.5	2.1	12	0.1
Fruit	13.5	3.4	46	0.2
Meat and eggs	45.6	368	16781	85.1
Fish	127.6	11	1404	7.1
Coffee and tea	7.3	35.7	261	1.3
Drinking water	648	0.1	55	0.3
Total			19730	100.0

The mean annual potassium intake is estimated to be approx. 1200 g. Hence the ^{137}Cs (g K)$^{-1}$ ratio becomes 16.4 pCi ^{137}Cs (g K)$^{-1}$. The daily intake in 1977 from food was 54 pCi ^{137}Cs.

3.8. Drinking water

The geometric mean calculated in 2.6 was used as the mean level of ^{90}Sr in drinking water, i.e. 0.37 pCi ^{90}Sr l^{-1}. The ^{137}Cs content was as previously[1] estimated at 1/4 of the ^{90}Sr content, i.e. approx. 0.1 pCi ^{137}Cs l^{-1}.

Tables 3.1 and 3.2 show the diet estimates of ^{90}Sr and ^{137}Cs respectively.

3.9. Discussion

The most important ^{90}Sr source in the Greenland diet is still grain products, which contribute 56.4% of the total ^{90}Sr content in the diet. Milk products came next in importance, contributing 18%. Approx. 84% of the ^{90}Sr in the food consumed in Greenland in 1977 originated from imported Danish food.

Meat is still for the most important ^{137}Cs source in the Greenland diet, contributing 85% of the total content in 1977. Approx. 93% of the ^{137}Cs in the Greenland diet in 1977 came from local products.

As compared with the 1976 figures, the ^{90}Sr content in the total diet in 1977 was a little lower than the 1976 level, while the ^{137}Cs level was nearly two times the 1976 level.

To estimate the maximum per capita intakes of ^{90}Sr and ^{137}Cs in Greenland in 1977 we again assume[1] that the only grain product consumed by a person is dark rye bread, and that he only eats lamb meat. His daily intake of ^{90}Sr is thus 8.6 pCi (5.6 S.U.) and his ^{137}Cs intake 322 pCi day^{-1} (using the quantities in tables 3.1 and 3.2). At the lower limit we can imagine a person eating white bread and seal and drinking water with hardly any activity (e.g. water formed by the melting of old ice). In this case the daily intakes are 2.5 pCi ^{90}Sr (1.6 S.U.) and 9 pCi ^{137}Cs. Hence the ratios between the levels in the maximum and minimum diets become 3.4 for ^{90}Sr and 36 for ^{137}Cs.

The ^{90}Sr content of the Greenland diet in 1977 was 87% of the estimated Danish mean content[2], and 52% of the Faroese level[3]. The ^{137}Cs level in the total diet in Greenland was 4.8 times that of the Danish diet and half the Faroese diet level.

4. CONCLUSION

4.1.

The ^{90}Sr fallout rates in 1977 were the following: Godhavn: approx. 0.3 mCi $^{90}Sr\ km^{-2}$; Godthåb: 0.4 mCi $^{90}Sr\ km^{-2}$; Prins Christians Sund: approx. 0.9 mCi $^{90}Sr\ km^{-2}$; Upernavik: 0.2 mCi $^{90}Sr\ km^{-2}$. The accumulated fallout levels by the end of 1977 were estimated at approx. 25 mCi $^{90}Sr\ km^{-2}$ at Godhavn, 36 mCi $^{90}Sr\ km^{-2}$ at Godthåb, 134 mCi $^{90}Sr\ km^{-2}$ at Prins Christians Sund, and 13 mCi $^{90}Sr\ km^{-2}$ at Upernavik.

4.2.

The food consumed in Greenland in 1977 contained on the average 3.3 pCi $^{90}Sr\ (g\ Ca)^{-1}$, and the daily mean intake of ^{137}Cs was estimated at 54 pCi. The most important ^{90}Sr contributors to the diet were grain products and milk products, together accounting for approx. 84% of the total ^{90}Sr content of the diet. Cesium-137 originated mainly from meat (reindeer and lamb) and fish, contributing 93% of the total ^{137}Cs content of the diet.

4.3.

No ^{90}Sr analyses of human bone samples have hitherto been carried out on the population of Greenland. Considering the estimated ^{90}Sr levels in the diet, it seems probable[4)], however, that the 1977 ^{90}Sr levels of humans in Greenland were on the average rather similar to those found in Denmark, i.e. the mean levels in human bone in Greenland were approx. 1 S.U. (vertebrae).

From diet measurements the ^{137}Cs content in Greenlanders was estimated at 50 pCi ^{137}Cs $(g\ K)^{-1}$.

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